

In the matter of

**State of Oklahoma, ex rel., A. Drew Edmondson in his capacity as Attorney
General of the State of Oklahoma, and Oklahoma Secretary of the Environment,
C. MILES TOLBERT, in his capacity as the Trustee for Natural Resources for the
State of Oklahoma, Plaintiffs**

v.

**Tyson Foods, Tyson Poultry, Tyson Chicken, Inc., Cobb-Vantress, Inc., Aviagen,
Inc., Cal-Maine Foods, Cal-Maine Farms, Inc. Cargill, Inc., Cargill Turkey Products,
LLC, George's, Inc., George's Farms, Inc., Peterson Farms, Inc., Simmons Foods,
Inc. and Willowbrook Foods, Inc., Defendants.**

CASE NO. 05-CV-329- GFK-SAJ

**in the United States District Court
for the Northern District of Oklahoma**

Expert Report

of

**J. Berton Fisher, Ph.D., CPG, RPG (TX #0201; MS#0301)
Lithochimeia, Inc.
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May 15, 2008**

within the Illinois River Watershed.³⁶ In 2007 Cal-Main acquired a 90% ownership interest in Benton County Foods, LLC that has production in the Arkansas portion of the Illinois River Watershed.³⁷ Benton County Foods, LLC was formerly George's Commercial Egg Division (a producer of commercial table eggs).³⁸ This acquisition included production facilities (i.e. houses with hens in them that produced the eggs), an egg packing plant where the eggs were processed and packed and well as miscellaneous equipment.³⁹

3. The contaminants of concern within the Illinois River Watershed are phosphorous and bacteria.

Many streams within the Illinois River Watershed show excessive algal growth, proliferation of non-desirable algal species and adversely altered fish communities as a consequence of high phosphorous levels.⁴⁰ In addition, many streams within the Illinois River Watershed, including the Illinois River, show high levels of fecal bacterial contamination during periods of high flow.⁴¹ Similarly, Lake Tenkiller, due to increases in phosphorous load, experiences decreased water clarity due to excessive algal growth, changes in the composition of algal species to less desirable species that dominate under high nutrient conditions and adversely altered fish communities.⁴²

4. Poultry are the primary contributors to the phosphorus pollution of soils, surface waters, ground waters, and sediments within the Illinois River Watershed.

Dr. Bernie Engle reviewed numerous studies regarding phosphorus loads to streams and rivers within the Illinois River Watershed and found that observed data and modeling evaluations presented in these studies indicate that the non-point phosphorous sources are the major

36 Videotaped 30(B)(6) Deposition of Cal-Maine Foods (Steve Storm), October 8, 2007, page 36 line 19-25; page 37 line 1-3; Videotaped 30(B)(6) Deposition of Cal-Maine Foods (Steve Storm), October 9, 2007, page 233 line 2-21.

37 Cal-Main Foods 10-Q SEC Quarterly Filing, April 1, 2008 <http://sec.edgar-online.com/2008/04/01/0001144204-08-019825/Section12.asp>.

38 30(B)(6) Deposition of Bennie McClure, August 15, 2007; page 20 line 7-11; page 21 line 7-25, page 22 line 1-18; page 95 line 4-25.

39 30(B)(6) Deposition of Bennie McClure, August 15, 2007; page 21 line 7-25, page 22 line 1-18.

40 Expert Report of G. Dennis Cooke and Eugene Welch, 2008.

41 Expert Report of Christopher Teaf, 2008; Expert Report of Valerie Harwood, 2008; Expert Report of Roger Olsen, 2008.

42 Expert Report of Jan Stevenson, 2008.

contributor to phosphorus within the streams and rivers of the Illinois River Watershed and to Lake Tenkiller.⁴³ A report concerning phosphorous mass balance within the Illinois River Watershed⁴⁴ found that poultry production is currently responsible for 76% of the annual phosphorous additions to the Illinois River Watershed. The phosphorous mass balance report also reports an allocation of phosphorous to sources other than poultry as: (1) commercial fertilizers (7.5%), (2) dairy cattle (5.2%), (3) humans (3.2%), (4) swine (2.9%), industrial sources – mostly poultry processing facilities (2.7%) and (5) beef cattle (1.7%). The remaining sources of phosphorus evaluated by Engle in his 2008 Expert Report (urban runoff, golf courses, wholesale nurseries, and recreational users) were negligible (< 1%). This report also found that historical data indicated that poultry production has been the major contributor of phosphorus to the watershed since 1964. The report also stated that from 1949 to 2002, there has been a net addition of more than 219,600 tons of phosphorus in the Illinois River Watershed with 68% of it, or more than 148,000 tons, attributable to poultry production.

The phosphorous mass balance report concludes that most of the phosphorus entering the Illinois River Watershed is retained upstream from the dam pooling Lake Tenkiller. Of the three phosphorus exports from the watershed (harvested crops, harvested deer, and water leaving Lake Tenkiller through the spillway) outflow of phosphorus through the spillway at the south end of Lake Tenkiller was the largest. According to current data, the flow of water through the spillway removes just over 1% of the annual phosphorus additions to the watershed. The remaining two phosphorus exports combined remove less than 0.5% of current annual phosphorus additions to the watershed.

The phosphorous mass balance report presented by Engle is also concordant with prior independent work that identified between 50 and 83% of the phosphorous mass balance in

⁴³ Expert Report of Bernie Engle, 2008.

⁴⁴ Expert Report of Bernie Engle, 2008.

the Illinois River Watershed as attributable to livestock.⁴⁵ Indeed, work done in 1997 showed that livestock were responsible for 78.63% of phosphorus inputs to the Illinois River Watershed River while fertilizer represented 7.21% of inputs and point sources represented 4.5% of inputs.⁴⁶ Work published by Slaton, et al.⁴⁷ that studied nutrient mass balance in Arkansas, found that the area with the greatest excess phosphorus was northwest Arkansas which includes Benton and Washington counties, and that the source of this excess phosphorus was animal manure, specifically poultry waste. In this study, nutrients contained in beef cattle manure were ignored because, "a large proportion of these nutrients are obtained from forage and deposited directly (i.e., recycled) to pastures during grazing rather than collected in lagoons or stockpiled from confined animal production facilities." Finally, the Slaton, et al. publication states that the accumulation of excess P in soils is problematic, since soil P levels are correlated to the amount of P in runoff, and concludes that current nutrient application strategies in western Arkansas are not sustainable without the danger of creating and/or exacerbating water quality issues from excessive nutrients. Dr. Roger Olsen, using a pathway sampling approach has shown that phosphorous and other constituents from poultry waste are transported from poultry waste disposal sites to surface water, ground water and stream and lake sediments within the Illinois River Watershed.⁴⁸

5. Poultry are highly significant contributors to bacterial pollution of surface and ground water within the Illinois River Watershed. Dr. Valerie Harwood has shown that bacterial DNA unique to poultry is found in poultry waste, soils that have received poultry

45 Smith, R. and R. Alexander, 2000. Sources of Nutrients in the Nation's Watersheds Managing Nutrients and Pathogens from Animal Agriculture. Proceedings from the Natural Resource, Agriculture, and Engineering Service Conference for Nutrient Management Consultants, Extension Educators, and Producer Advisors, March 28-30, 2000. Camp Hill, Pennsylvania; Smith, R. A., G. E. Schwartz and R. B. Alexander, 1997. Regional interpretation of water-quality monitoring data. Water Resources Research, 33: 2781-2798.

46 Smith, R. A., G. E. Schwartz and R. B. Alexander, 1997. Regional interpretation of water-quality monitoring data. Water Resources Research, 33: 2781-2798.

47 Slaton, N. A. Brye, K. R., Daniels, M. B., Daniel, T. C., Norman, R. J. and Miller, D. M. 2004. Nutrient Input and Removal Trends for Agricultural Soils in Nine Geographic Regions in Arkansas. J. Environ. Qual. 33:1606-1615 (PI-Fisher00005182 - PI-Fisher00005191).

48 Expert Report of Roger Olsen, 2008.

waste, edge of field runoff from fields upon which poultry waste has been disposed, surface waters and some ground water samples within the Illinois River Watershed⁴⁹ Dr. Roger Olsen, using a pathway sampling approach combine with a principal component analysis (PCA), has shown that fecal bacteria from poultry waste are transported from poultry waste disposal sites to waterways and ground water within the Illinois River Watershed.⁵⁰ Dr. Christopher Teaf has evaluated the amount of fecal bacteria contributed to the Illinois River Watershed. He has determined that 41.1 % is contributed from poultry waste, 44.4% percent is contributed by cattle, 13% is contributed by swine, 0.9% is contributed by failing septic tanks and 0.01% is contributed by WWTP effluents.⁵¹

6. The population of poultry within the Illinois River Watershed has shown an overall increase since at least 1950. Based on Defendants documents⁵², a total of at least 1.1 billion birds of all types⁵³ have been produced by Defendants within the Illinois River Watershed during the period 2000 through 2007. The total number of birds produced within the Illinois River Watershed by Defendants is shown in Table 1 below.

⁴⁹ Expert Report of Bernie Engle, 2008.

⁵⁰ Expert Report of Roger Olsen, 2008.

⁵¹ Expert Report of Christopher Teaf, 2008.

⁵² Defendants' information concerning recent poultry production within the Illinois River Watershed (Cal-Maine Exhibits 46 47.pdf; Cargill Inc 2nd supp answer.pdf; Cargill Turkey 2nd supp answer.pdf; CARTP177361.pdf; CART177359.pdf; cover.pdf; DOC20080107140732.pdf; DOC20080107140753.pdf; DOC20080107140816.pdf; DOC20080107140838.pdf; Georges.mdb; IRW Breeders -- Created by Court Order-Not Kept in Ordinary Course of Business.xls; IRW Broilers -- Created by Court Order - Not Kept in Ordinary Course of Business.xls; Peterson 2nd Supp Response to First Interr and RFP.pdf; SIMAG32198- number Birds and feed.pdf; Total Bird Counts.xls).

⁵³ The total is 1,130,938,719 birds of all types.